

# **Salmon and Steelhead Habitat Limiting Factors Report for the Foster and Moses Coulee Watersheds**

Water Resource Inventory Areas (WRIA) 50 and 44

**FINAL REPORT**

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## EXECUTIVE SUMMARY

The Foster Water Resource Inventory Area (WRIA) 50 and Moses Coulee Water Resource Inventory Area (WRIA) 44 are located close to the geographic center of Washington State in the “Big Bend” area of the Columbia River. The Foster WRIA 50 drains an approximate 334 square mile watershed (213,639 acres) in northern Douglas County. In WRIA 50, East, Middle, and West Foster Creek converge and flow northward emptying into the Columbia River downstream of Chief Joseph Dam (Columbia River Mile 545.1) near the town of Bridgeport. A small portion of WRIA 50 lies within Okanogan County and drains directly into the Columbia River. The Moses Coulee WRIA 44 drains an approximate 1,213 square mile watershed (776,222 acres). Moses Coulee extends southwest from central Douglas County before emptying into the Columbia River (Columbia River Mile 447.0). A small portion of WRIA 44 lies within Grant County. Portions of WRIA 50 and 44 outside of Douglas County are not addressed in this report. Small sections of WRIA 40 and WRIA 42 fall within Douglas County that are not addressed in the report.

Water Resource Inventory Areas 50 and 44 lie within the Upper Columbia River Salmon Recovery Region called an Evolutionarily Significant Unit (ESU) by the National Marine Fisheries Service (NMFS) and a Distinct Population Segment (DPS) by the U.S. Fish and Wildlife Service (USFWS), the two federal agencies charged with protecting and restoring species listed under the federal Endangered Species Act (ESA). Summer/fall-run chinook salmon that occur in the Upper Columbia (ESU) are not listed under the ESA. However, the Methow and Okanogan River stocks are designated “depressed” in the Washington State 1992 Salmon and Steelhead Stock Inventory (SASSI); the Wenatchee summer/fall-run chinook stock is designated “healthy”. Neither of the two sockeye salmon runs that occur in the Upper Columbia ESU are listed under the ESA. Both the Lake Osoyoos (Okanogan Watershed) and the Lake Wenatchee sockeye stocks are designated “healthy” in the SASSI. Coho salmon have been extirpated from the upper Columbia River region and are not addressed in the SASSI or under the ESA. Summer steelhead within the Upper Columbia ESU were listed under the Endangered Species Act (ESA) as “Federally Endangered” on August 18, 1997. Spring-run chinook salmon within the Upper Columbia ESU were listed under the ESA as “Federally Endangered” on March 24, 1999. Bull trout in the Upper Columbia DPS were listed under the ESA as “Federally Threatened” on June 10, 1998. All of these salmonid species (except the extirpated coho salmon) presently utilize the upper Columbia River, which forms the western boundary of Douglas County and cuts through the northern portion of WRIA 50, separating the WRIA in Douglas and Okanogan counties. To a very limited extent, both summer steelhead and chinook also utilize some tributaries of WRIA 50 and 44 (Foster Creek, Corbaley Canyon, Sand Canyon, Rock Island Creek and Moses Coulee).

The Salmon and Steelhead Habitat Limiting Factors Report for the Foster and Moses Coulee Watersheds focuses on habitat conditions in the watersheds as they affect the ability of habitat to sustain naturally producing salmonid populations. The report briefly discusses salmon and steelhead use in the Columbia River, but acknowledges the river is

being addressed on a regional level and is outside the scope of this document. It provides a snapshot in time based on data and published material available during the development of this report and the knowledge of technical fish experts and landowners serving as the Technical Advisory Group (TAG). Although revisions to the report are not currently funded, the Washington State Conservation Commission (WCC) will be requesting funding in the 2001-2003 budget for a continuation in funding to allow for this need.

Data in the literature on habitat conditions in the watersheds is extremely limited. As pointed out by those reviewing the report, conclusions within the existing literature often lack adequate supporting data and in some cases are contradictory. Thus, the report relies heavily on professional and local knowledge to identify salmonid distribution and habitat impairments, and to assess the extent to which habitat conditions are negatively affecting salmonid use in the watershed.

### **Factors Affecting Natural Salmonid Production in the Watershed**

Salmon distribution and productivity in the Foster and Moses Coulee Watersheds is naturally limited by the lack of hydrology to support year round flows in most drainages. In the arid, shrub-steppe environment, most streams are seasonal, feed by spring runoff or intense summer storm events, or are intermittent, feed by a spring system. Some years there are perennial flows in some streams, but this hydraulic continuity is unlikely year-round (TAG 10-30-00). Human alterations to the environment can exacerbate these natural low flow conditions, reducing habitat access, quantity, and quality.

Fish passage barriers (such as irrigation diversion dams and culverts) limit fish distribution and use to generally the first mile of streams in the Foster and Moses Coulee watersheds. Given the natural lack of hydrology, it is uncertain to what extent these streams may once have supported salmonid productivity beyond the first mile or so even prior to human disturbance in the watersheds, although it is believed to be minimal (TAG 10-30-00). Studies are needed that would assist in the evaluation of instream flows as they relate to changes in wetland functions, floodplain functions, groundwater/surface water interactions, and upland vegetation changes in the watersheds. Information generated by these studies would contribute to making more informed conclusions about the extent to which human-created fish passage barriers limit salmonid distribution and use beyond those limitation already imposed by the seasonal nature of flows in WRIA 50 and 44.

Stream channels and riparian conditions have been drastically altered by flood events and human activity. The extent to which these alterations impact salmonid distribution and productivity is uncertain, given the natural limitations to distribution and productivity already imposed by the lack of hydrology. A lack of information on salmonid use and stream channel/riparian impacts within the watersheds adds to the uncertainty. Water temperatures may also be a factor negatively affecting salmonid productivity within the watersheds, given low flow conditions. The extent to which human activities may exacerbate this condition is unknown. Studies are needed that collect data and analyze the change over time in riparian habitat, wetland habitat, floodplain function, sediment delivery and transport, temperature regimes, and groundwater/surface water interactions.

Information generated by these studies would contribute to making more informed conclusions about the extent to which salmonid productivity is limited beyond natural conditions, by human-induced alterations to stream channels and riparian conditions.

Studies on surface water quality have been conducted in East Foster Creek (WRIA 50), Douglas Creek and tributaries (WRIA 44) and the Sagebrush Flats area (WRIA 44, Upper and Lower Moses Coulee Subwatersheds). These studies have indicated some degree of soil erosion and sedimentation is occurring, lowering water quality within the watersheds and the drainages downstream on to the Columbia River. Erosion problems occur due to fine-grained soils susceptible to erosion, intense rainfall, or sudden snowmelt but the studies were of short duration and are now dated making it impossible to draw any reliable conclusions. It is difficult to identify the cause of soil erosion and sedimentation and draw conclusions between farming practices, on-site conservation practices, and water quality.

Ground water quality was monitored in wells around Mansfield and Douglas Creek. Samples were found high in nitrates and coliform bacteria, relative to drinking water standards. In Mansfield there was no conclusive evidence as to the source of nitrate problem and nitrate concentration fluctuations (Johnson 1974). High nitrates around Douglas Creek according to hydrologist, Allen Isaacson in a Water Quality Report for South Douglas Conservation District in 1989, were due to the high percentage of land that is fertilized and the low flows that do not dilute these levels until lower in the watershed (Isaacson 1989).

A more detailed discussion of known habitat conditions in each subwatershed can be found in the *Habitat Limiting Factors by Subwatershed* chapter of this document. As stated above, the lack of existing baseline data for such basic habitat attributes like instream flows, sedimentation and temperature, and the lack of analysis comparing the change in riparian, wetland, floodplain and upland habitats, limits this report to a reliance almost entirely on the professional expertise of the TAG and landowners as the best available science. As more data is collected and analysis conducted, the assessments of this TAG can be refined and new conclusions may be drawn. More data and analysis can lead to a greater accuracy in assessing the affects of habitat conditions on salmonid spawning and rearing use in the Foster and Moses Coulee Watersheds. Presently, it is the conclusion of the TAG and landowners that although there are human impacts in the Foster and Moses Coulee Watersheds, these impacts have a very limited affect on anadromous salmonid spawning and rearing use in the watersheds. This is mostly a reflection of the natural limitation imposed on the habitat by the arid, shrub steppe ecosystem (TAG 10-30-00; TAG 11-21-00).

### **Recommendations made by Technical Fish Experts and Landowners**

Recommendations made by the technical fish experts and landowners at the October 30, 2000 Salmon Forum were as follows:

- Conduct general presence/absence salmonid surveys on selected streams highlighted by the information provided so far by the TAG (Foster, Moses

Coulee, Sand Canyon, Rock Island, Douglas Creek). Salmonid distribution information is limited and based on existing professional knowledge and surveys in the 1970's, 1980's, and 1990's. Habitat conditions have changed and there is a need to conduct an updated salmonid survey.

- Collect baseline data on known fish bearing streams for the following habitat parameters: fine sediment, temperature, and instream flows. Use commonly accepted survey protocols (i.e. Hankin and Reeves. 2000. Pacific Northwest Region US Forest Service Stream Inventory Handbook, Level I and II).
- Research surface/ground water interactions and investigate the opportunity for augmenting low instream flows.
- Install stream gauges to learn more about the instream flows in WRIA 44 and 50.
- Using historical information gathered from landowners, conduct analyses of changes over time of riparian, floodplain and wetlands acreage and conditions, and uplands vegetation cover types, as they affect watershed hydrology.
- Habitat restoration projects must be directed at the condition(s) causing the habitat degradation (causal mechanisms), not at its symptoms. Structural manipulations of the stream channel (such as boulder or log placements) should not be used unless those causal mechanisms cannot be corrected within a reasonable time. Attempts to restore habitat are likely to fail if structures are placed in the stream channel without addressing those activities that are causing the habitat degradation. To identify causal mechanisms prior to implementing any structural manipulation of the channel, an evaluation of the stream channel hydrology, geology and morphology (hydrogeomorphology) must first be conducted. Habitat restoration projects must be designed to conform to natural channel processes when possible. Potential impacts from habitat restoration projects that do not support natural channel processes must be fully understood prior to implementation. For example, during high flows, rehabilitating structures are likely to blow out and it would be senseless to repair an artificial habitat after every flood event.

Overriding inventory and assessment needs for the Foster and Moses Coulee watersheds include a watershed-wide collection of baseline data. A more detailed list of data gaps is included in the *Data Gaps and Recommendations* chapter.